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## Development of nutrition standards and therapeutic diet specifications for public hospitals in New South Wales

### Abstract

In New South Wales (NSW), a new suite of nutrition standards for menus and specifications for therapeutic diets to be used in hospitals has been developed. These standards were required to facilitate centralised menu planning and food production, with the move to management of most hospital food services by HealthShare NSW, a state-wide business unit of NSW Health. The standards also aim to improve communication between health professionals, particularly with the increasing use of computerised meal-ordering systems. Nutrition standards have been developed for adult, paediatric and mental health inpatients, and specifications for 147 different adult and paediatric therapeutic diets. There is still significant variation in the nutrition standards for nutrition and therapeutic diets in hospitals across the Australian states, and a move to a more nationally harmonised approach would be welcome. Further research is required to examine the impact of these standards on operating efficiency and patient care outcomes.

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## **Abstract**

In New South Wales, a new suite of nutrition standards for menus and specifications for therapeutic diets to be used in hospitals has been developed for NSW hospitals. These standards were required to facilitate centralised menu planning and food production, with the move to management of most hospital food services by HealthShare NSW, a State-wide business unit of the NSW Health. They also aim to improve communication between health professionals, particularly with the increasing use of computerised meal ordering systems. Nutrition standards have been developed for adult, paediatric and mental health inpatients, and specifications for 147 different adult and paediatric therapeutic diets. There is still significant variation in the nutrition standards for nutrition and therapeutic diets in hospitals across the Australian States and there should be a move to a more nationally harmonised approach would be welcome. Further research is required to examine the impact of these standards on operating efficiency and patient care outcomes.

## **Key question summary**

### 1) What is known about the topic

The development of nutrition standards for Australian hospitals is a new process and has not been described in the literature previously

### 2) What does this paper add?

This paper provides a description of the process used in NSW to develop nutrition and diet standards, and citations of the key new documents, which could inform practitioners and policy makers in other States

### 3) What are the implications for practitioners?

Hospital managers, foodservice staff, dietitians and other clinicians in NSW will need to be aware the requirement in the new standards to ensure best practice care. Those in other jurisdictions should try to ensure movement towards more nationally consistent guidelines and standards.

## **Introduction**

The NSW government established the Agency for Clinical Innovation (ACI) as a board-governed statutory health corporation in 2010, in response to the Special Commission of Inquiry into Acute Care Services in NSW Public Hospitals<sup>1</sup>. The ACI seeks to drive innovation across the health system by using the expertise of its clinical networks to develop and implement evidence-based standards for the treatment and care of patients.

The Nutrition in Hospitals (NIH) Working Group within the ACI Nutrition Clinical Network was established to advise NSW Health about developing an integrated approach to optimising food and nutritional care in NSW public healthcare facilities. The working group includes doctors, nurses, dietitians, speech pathologists, consumers, academics and food service and health support services staff. Under the auspices of the Nutrition and Food Committee of NSW Health, the ACI has developed a suite of nutrition standards and therapeutic diet specifications:

1. Nutrition standards for adult inpatients in NSW hospitals<sup>2</sup>
2. Nutrition standards for paediatric inpatients in NSW hospitals<sup>3</sup>
3. Nutrition standards for consumers of inpatient mental health services in NSW<sup>4</sup>
4. Therapeutic diet specifications for adult inpatients<sup>5</sup>
5. Therapeutic diet specifications for paediatric inpatients.<sup>6</sup>

This article describes some of the historical background to these standards, the development process used and their structure, along with some comments on the effects of their implementation.

## **History**

The development of regulatory nutrition standards for meals and special diets in NSW hospitals is relatively recent. In the early days of the colony, hospitals provided only minimal food for patients (largely based on meat and bread, with only limited quantities of milk or vegetables) and it was expected that relatives would bring in additional food to ensure patients were adequately nourished.<sup>7</sup> Until the 1930s, food service in hospitals was the responsibility of nursing housekeepers. In 1936 Royal

Prince Alfred Hospital employed the first dietitian in NSW, with a primary responsibility to manage the food and dietetic services.<sup>8</sup>

Until the 1980s there were no regulations governing meal planning in most NSW hospitals. The 5<sup>th</sup> Schedule (psychiatric) hospital foodservices operated within a food ration plan that specified the basic foods to be provided, to ensure a nutritionally adequate quantity of food was available to each patients, but there were no detailed menu planning standards.<sup>9</sup> The Health Commission of NSW published a “Food Services Manual” in 1977 with some information on dietary modifications, including minimal recommended selections for a patient selective menu.<sup>10</sup> However, this was not a standard with any regulatory force, and planning was a responsibility devolved to individual hospitals.

In 1988, the Greiner government introduced a policy of encouraging the contracting out of hospital “hotel” services. A brief set of minimum standards for food services was written that would be required to be met by all contractors, which included standards for food serving sizes and the minimum number of food choices to be offered.<sup>11</sup> These “Standards for Food Services” specified that special diet menus should as far as possible be integrated into the main menu and that a sufficient range of food items must be available to meet individual dietary requirements. More comprehensive guidelines from the Institute of Hospital Catering in 1997 also included recommended minimum daily food choices to be provided to patients, but those had no regulatory force, and did not define the requirements for different therapeutic diets.<sup>12</sup>

In 1908 Dr Philip Muskett, who was Surgeon Superintendent to the NSW Government, published a book of over 600 pages which included many specific diet plans, particularly aimed at informing nursing staff in hospitals.<sup>13</sup> The first specifications written by a NSW dietitian seems to have been from Evelyn Anderson at the Royal Newcastle Hospital in 1939, in a manual that identified 23 diet types. Five years later, a Royal Prince Alfred Hospital manual defined 53 therapeutic diets<sup>14</sup>, and various hospitals developed their own specifications in subsequent years. It was not until 1957 that the Nutrition Section of the Commonwealth Department of Health

published the first national guidelines which were updated regularly through the 1960s.<sup>15</sup> In 1980 the Commonwealth released a “Hospital Diet Manual for Caterers and Diet Supervisors”, which defined food choices for 19 diet types, with the specific aim of being useful in hospitals where there were no full-time dietitians.<sup>16</sup>

The Dietitians Association of Australia (DAA) began publishing a Diet Manual in 1988 and the most recent edition defined 35 evidence-based diet plans.<sup>17</sup> Nonetheless, while these professional recommendations informed practice within individual hospitals in NSW, there remained differences between Health Areas in the range and specifications of therapeutic diets that were used in public hospitals.

With the introduction in 2006 of Health Support Services (since renamed HealthShare NSW<sup>18</sup>), a State-wide business operation to manage a range of hospital activities including food services, there was a need for a more uniform State-wide approach to meeting patient nutrition and therapeutic diet requirements. Common standards were required to facilitate centralised menu planning and food production, as well as to improve communication between health professionals, particularly with the increasing use of computerised meal ordering systems.<sup>19</sup>

## **Standards Development Process**

### *Nutrition Standards*

In August 2009, the ACI commissioned a consultant academic dietitian with expertise in food service to develop nutrition standards for adult inpatients in NSW hospitals. The project was guided by a reference group of dietitians, food service managers and consumer representatives. These standards built on previous policy documents in NSW<sup>11, 20-22</sup> and other Australian states,<sup>23-26</sup> aiming to develop standards that were evidence-based, nationally consistent where possible, easy to interpret and implement, yet able to allow for flexibility and innovation in local implementation.

They contained three components:

1. A set of overarching principles to underpin a patient-focussed meal service
2. Goals for 10 key nutrients, which all menus needed to provide to enable the majority of patients to meet their individual nutrient requirements, and
3. A standard for the minimum number of food choices offered to patients and serving sizes for each type of menu item.

Test menus were included to demonstrate the practicality of the standards, and the rationale for each requirement was given with an extensive reference list. To simplify the specification of foods to providers, a modified version of nutrition standards developed for use in Victorian hospitals was included as an appendix, which classified different menu items into two or three bands depending on their nutrient density.<sup>23</sup> One of the key inclusions in the standards was the requirement to offer at least one high-energy mid-meal snack per day ( $\geq 500\text{kJ}$ ), as one strategy to tackle the well-recognised problem of malnutrition in hospitals.<sup>27-29</sup>

The initial drafts were modified by the reference group and then circulated widely for comment to all local health districts, and key professional organisations. The final version was approved by the NIH Working Group and endorsed by the Nutrition and Food Committee of NSW Health, then published in 2011 and made freely available on the ACI website.<sup>2</sup>

After development of the adult standards, a companion document was developed for use with paediatric inpatients, written by a reference group of specialist paediatric dietitians and food service dietitians. These standards followed the same format as the adult standards, but different sets of standards were defined for six age groups: from 0-6 months through to 14-18 years.<sup>3</sup>

Finally, a separate standard was developed in 2013 for consumers of inpatient mental health services.<sup>4</sup> It was recognised that these consumers have some specific nutrition issues that are different from most adult inpatients. They are often institutionalised for long periods of time, have high rates of obesity and are at particular risk of metabolic syndrome and disordered eating of various kinds.<sup>30</sup> Whereas the general adult standards were driven primarily by a concern about the



risks of under-nutrition, limiting energy intakes is a key issue in the mental health standards, as well other issues such as the management of caffeine intakes, specifying some glycemic index targets, and ensuring higher intakes of long-chain n-3 fatty acids.

These standards were developed with the same consultant dietitian and informed by an audit of patient food concerns conducted by the Official Visitors Program and a multidisciplinary steering group. They were circulated for consultation with the Mental Health Commission of NSW, the Mental Health and Drug and Alcohol Office, the Mental Health Clinical Advisory Council, local health districts and specialty networks, the Nursing and Midwifery Office, Chief Allied Health Officer, HealthShare NSW, the Official Visitors Program, NSW Consumer Advisory Group (Mental Health), the Institute of Hospitality in Healthcare, and professional allied health organisations.

### *Therapeutic Diet Specifications*

In 2008, the NSW Health Nutrition and Dietetic Advisors Group (NDAG) – a group of senior dietetic managers from NSW hospitals - developed a document to establish a consistent set of naming conventions and definitions for diets to be used in NSW hospitals.<sup>31</sup> Using this, a census of all hospitals was undertaken in 2009 to record all the special diets ordered on one day. The reported results showed a high proportion (58%) of patients were on a special diet and that the proposed naming conventions could encompass the range of diets used in practice.<sup>32</sup> It was also noted that while some health Areas had established common standards for diet specifications,<sup>33,34</sup> there were inconsistencies in the specifications and some Areas had no established guidelines.

A Steering Group was established to oversee a project to develop common diet specifications, which included academics, dietitians from different health areas, health support staff, and a consumer representative. That group established the range of diets to be developed, agreed on the development of a standard template for presentation of the specifications, and advised on the consultation and approval processes. The specifications were to be:

- presented in an agreed standardised format
- consistent in wording and definitions
- easy to read and interpret by non-specialist staff (e.g. food service or nursing staff without access to a dietitian)
- sufficiently detailed to be confident that they support safe and appropriate meal provision to patients on therapeutic diets, and
- based on the best available evidence.

Wherever possible the diet names are specific to the nutrient to be modified (eg, low sodium), rather than being based on terms describing disease states (eg, cardiac).

A consultant was again employed to develop detailed specifications for each of 115 therapeutic diets used in NSW public hospitals, describing the foods that are allowed or not allowed, with relevant nutrient targets for each main meal component. Initial drafts of the specifications were based on existing diet standards used by NSW Health facilities, Australian and American dietetic manuals, nationally endorsed dietetic practice guidelines, and standard textbooks of dietetic practice. Where there was insufficient evidence-based information from these sources, targeted literature searches were undertaken to look for primary published literature to inform and support the diet specifications.

All the draft diet specifications were posted on the ACI website for open comment and advertised in the ACI newsletter. The NIH Working Group (with doctors, nurses, dietitians, speech pathologists, consumers, academics, food service staff and Health Support Services), The Speech Pathology Advisors Group, Pathology Services in each Area Health Service, and NSW members of the DAA were invited to comment. A total of 34 responses were received and after incorporation of appropriate suggested changes a revised version was sent to the NDAG for review and the final version submitted to the NSW Health Nutrition and Food Committee for approval and endorsement.

Many of the therapeutic diet specifications developed for adults were noted in the standards as also suitable for use with paediatric patients. However it was recognised that there was a need to specify age-appropriate diets and provide

additional therapeutic diet specifications with appropriate restrictions for children while allowing adjustment for growth needs. A senior paediatric dietitian led a separate project to develop 32 separate paediatric specifications, which was published in 2012.<sup>6</sup>

## **Discussion**

These new standards are part of a broader framework to improve nutrition care in NSW hospitals, encompassing clinical care as well as foodservices. The two year implementation of the new standards will be completed by the end of 2014 and the next steps will be to undertake a more formal evaluation of their impact on work practices and patient care. However in the mean time informal feedback suggests:

1. The standards have been widely welcomed and adopted, both by clinical dietitians and food service providers. In particular the diet specifications have been used when implementing new computerised diet ordering systems
2. The process of review and modification of specifications has already been utilised, managed through the NIH committee within the ACI Nutrition Network
3. The new standards have raised the profile of nutrition issues in hospitals generally. Following the publication of the nutrition standards and diet specifications in 2011, a policy directive was released that required all NSW public hospitals to implement these new standards.<sup>35</sup>
4. The nutrition standards have been used in some private hospitals in NSW and as a model in other States. The new Western Australia standards have adopted the same format and almost all of the content of the NSW standards.<sup>36</sup>

The success of the standards is likely to be due to several factors:

- Utilising the established clinical networks to build system wide consensus
- Multidisciplinary steering groups managed their development, with representatives from nutrition, foodservice, medicine, nursing and consumer sectors. This ensured all relevant perspectives were included in the work

- Surveys of consumers were undertaken to ensure their perspectives and issues were appreciated before the standards were developed
- Employment of specialist consultants to undertake the research and draft initial and final versions of the documents. This drew on specialist expertise and made the process more time efficient than if it had been undertaken by health staff managing competing daily work.
- An extensive consultation processes, which ensured likely problems were uncovered and addressed, and that the standards were understood by a wide cross-section of relevant clinical and support staff.
- A strong evidence base for the recommendations, with extensive bibliographic support.
- Endorsement at a high level within the Ministry of Health, followed by policies that mandated their adoption.

There is still significant variation in the standards for nutrition and therapeutic diets in hospitals between the Australian States. In 2012 Queensland released new standards, which cover not only hospitals but also aged care residential facilities.<sup>24</sup> Unlike the NSW documents, those standards do not set nutrient targets, but include a lot more prescription of the menu planning process to ensure adequate food variety across the menu cycle.

It is to be hoped that in the future there can be a move to a more nationally harmonised approach (perhaps even including New Zealand), which will reduce the duplication of effort in developing and managing standards, but also give more consistent guidance to manufacturers who are producing food for use in hospitals. There is also now the opportunity to conduct evaluation of the impact of the standards on consumer satisfaction, food waste and dietary intakes.

## References

1. Garling P. *Special Commission of Inquiry into Acute Care Services in NSW Public Hospitals*. Sydney: NSW Department of Attorney General and Justice; 2008. Available at: [http://www.lawlink.nsw.gov.au/lawlink/Corporate/ll\\_corporate.nsf/pages/attorney\\_generals\\_department\\_acsinquiry](http://www.lawlink.nsw.gov.au/lawlink/Corporate/ll_corporate.nsf/pages/attorney_generals_department_acsinquiry). (Accessed on 18 June 2013.)
2. Agency for Clinical Innovation. *Nutrition standards for adult inpatients in NSW hospitals*. Sydney: NSW Agency for Clinical Innovation; 2011. Available at: [http://www.aci.health.nsw.gov.au/data/assets/pdf\\_file/0004/160555/ACI\\_Adult\\_Nutrition\\_web.pdf-zoom=100](http://www.aci.health.nsw.gov.au/data/assets/pdf_file/0004/160555/ACI_Adult_Nutrition_web.pdf-zoom=100). (Accessed on 4 March 2013.)
3. Agency for Clinical Innovation. *Nutrition standards for paediatric inpatients in NSW hospitals*. Sydney: NSW Agency for Clinical Innovation; 2011.
4. Agency for Clinical Innovation. *Nutrition standards for consumers of inpatient mental health services in NSW*. Sydney: NSW Agency for Clinical Innovation; 2013.
5. Agency for Clinical Innovation. *Therapeutic diet specifications for adult inpatients*. Sydney: NSW Agency for Clinical Innovation 2011. Available at: [http://www.aci.health.nsw.gov.au/data/assets/pdf\\_file/0006/160557/ACI\\_AdultDietspecs.pdf](http://www.aci.health.nsw.gov.au/data/assets/pdf_file/0006/160557/ACI_AdultDietspecs.pdf). (Accessed on 11 July 2013.)
6. Agency for Clinical Innovation. *Therapeutic diet standards for paediatric inpatients in NSW hospitals*. Sydney: NSW Agency for Clinical Innovation; 2012.
7. Walker R, Roberts D. *From scarcity to surfeit. A history of food and nutrition in New South Wales*. Kensington: New South Wales University Press; 1988.
8. Clements F. *A history of human nutrition in Australia*. Melbourne: Longman Cheshire; 1986.
9. Williams P. *Menu Planning for the Future*. In: Nutrition and Cost Control. Hosplan Seminar No 55. Sydney: NSW Hospitals Planning Advisory Centre; 1986.
10. Health Commission of NSW. *Food Services Manual*. Sydney: Health Commission of NSW; 1977.
11. NSW Department of Health. *Standards for food services. State Health Publication MA 89.066*. Sydney: NSW Department of Health; 1989.
12. Institute of Hospital Catering (NSW). *Food Service Guidelines for Healthcare*. Sydney: Institute of Hospital Catering; 1997.
13. Muskett P. *The attainment of health and the treatment of different diseases by means of diet*. Sydney: William Brooks; 1908.
14. Anon. *Royal Prince Alfred Hospital Diet Manual*. Sydney: Royal Prince Alfred Hospital; 1944.
15. The Nutrition Section Commonwealth Department of Health. *Notes on Special Diets for Use in Hospitals*. Canberra: The Australian Institute of Anatomy; 1957.
16. Plain J, Cornish M, Corden M. *Hospital diet manual for caterers and diet supervisors*. Canberra: Commonwealth Department of Health; 1980.
17. Dietitians Association of Australia. *Nutrition manual 8th ed*. Canberra: DAA; 2009.
18. NSW Government. *About HealthShare NSW*. Sydney: NSW Department of Health; 2013. Available at: <http://www.hss.health.nsw.gov.au/about-hss>. (Accessed on 20 June 2013.)

19. Ayres E, Hogg L. Advancing practice: using nutrition information and technology to improve health – the nutrition informatics global challenge. *Nutr Diet*. 2012;69:195-197.
20. NSW Department of Health. *Hospital Menu Assessment Tool: manual version*. State Health Publication No HP 990109. Sydney: NSW Department of Health; 1999.
21. Martin S, Macoun E. *Food and Nutrition Strategic Directions 1996-2000. Healthier food choices in hospitals*. State Health Publication HP 96-0195. Sydney: NSW Department of Health; 1996.
22. Clinical Governance Unit Northern Sydney Central Coast Area Health Service. *Nutritional Care Policy (PO2008\_002)*. North Sydney: NSW Health; 2008.
23. Department of Human Services (Victoria). *Nutrition Standards for Menu Items in Victorian Hospitals and Residential Aged Care Facilities*. Melbourne: Department of Human Services; 2009. Available at: [http://www.health.vic.gov.au/archive/archive2011/patientfood/nutrition\\_standards.pdf](http://www.health.vic.gov.au/archive/archive2011/patientfood/nutrition_standards.pdf). (Accessed on 11 July 2013.)
24. State-wide Foodservices Policy and Planning. *Queensland Health Nutrition Standards for Meals and Menus*. Brisbane: Queensland Health; 2012.
25. Carter P. *Nutrition benchmarks and guidelines for hospital menus: towards the development of best practice patient foodservices and hospital cafeterias in South Australian Health Commission hospitals*. Adelaide: Department of Public Health, Flinders University of South Australia; 1996.
26. Department of Health - Western Australia. *Nutrition specifications for hospital food service*. Perth: WA Department of Health; 2005.
27. Middleton M, Nazarenko G, Nivison-Smith I, et al. Prevalence of malnutrition and 12-month incidence of mortality in two Sydney teaching hospitals. *Internal Medicine Journal*. 2001;31:455-461.
28. Walton K, Williams P, Tapsell L, et al. Rehabilitation inpatients are not meeting their energy and protein needs. *e-SPEN Eur e-J Clin Nutr Metab*. 2007;2:e120-e126.
29. Matthews R, Bartlett J, Hall J. *Nutrition Matters - Patient Centred Nutrition Project Diagnostic Report*. Sydney: Northern Sydney Central Coast Area Health Service; 2007.
30. Ratcliffe T, Dabin S, Barker P. Physical healthcare for people with serious mental illness. *Clin Governance*. 2011;16:20-28.
31. NSW Health Nutrition and Dietetic Advisors Group. *NSW Health Therapeutic Diet Specifications. Part One*. Sydney: NSW Health; 2008.
32. Nutrition and Dietetics Advisors Group. *Diet order snapshot*. Sydney: NSW Health; 2009.
33. Spechler F. *Northern Sydney Health Area Food Services Diet Code Manual*. North Sydney: Northern Sydney Health; 2004.
34. Clinical Nutrition Services SESIAHS. *Therapeutic Diets Specification Version 12*. Sydney: South Eastern Sydney Illawarra Area Health Service; 2008.
35. Office of the Chief Health Officer. *Policy Directive: Nutrition Care (PD2011\_078)*. Sydney: NSW Health; 2011. Available at: [http://www0.health.nsw.gov.au/policies/pd/2011/pdf/PD2011\\_078.pdf](http://www0.health.nsw.gov.au/policies/pd/2011/pdf/PD2011_078.pdf). (Accessed on 21 June 2013.)
36. Department of Health - Western Australia. *Nutrition standards for adult inpatients in WA hospitals*. Perth: Government of Western Australia; 2012.